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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/661,041	09/12/2003	Scott D. Allen	YOR920030175US1	6716

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EXAMINER

NGUYEN, CUONG QUANG

ART UNIT	PAPER NUMBER
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2811

DATE MAILED: 01/11/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/661,041	Applicant(s) ALLEN ET AL.	
	Examiner Cuong Q. Nguyen	Art Unit 2811	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
 4a) Of the above claim(s) 25-27 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1,9,10,13-17,19 and 22-24 is/are rejected.
- 7) ☒ Claim(s) 2-8,11,12,18,20 and 21 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>01-26-04</u> | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Election/Restriction

1. Applicant's election with traverse of Embodiment 3, claims 1-24 and 27 is acknowledged. The traversal is on the ground(s) that "If the search and examination of an entire application can be made without serious burden, the Examiner must examine it on the merits, even though it includes claims to distinct or independent invention." This is not found persuasive because according to MPEP 802.01 that two embodiment appear to be independent as claimed Applicants have to elect only one of these embodiments. However, there is no evidence of record that the search and examination of an entire application including two distinct embodiments can be made without serious burden for Examiner.

The requirement is still deemed proper and is therefore made FINAL.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 9, 13, 14, 16, 19, 22, 23, and 24 are rejected under 35 U.S.C. 102(e) as being anticipated by Park (US 6,774,032).

Regarding claims 1, 13, Park discloses a method for patterning one or more features in a semiconductor device, the method comprising the step of reducing at least one critical dimension of the one or more features (contact hole) during etching of an antireflective material (101) (col.2 lines 60-65). See Fig.1a to Fig.1d.

Regarding claims 9, 22, 23, 24, Park teaches that the antireflective material is deposited on a substrate (a dielectric substrate 100 formed by a low-k material of fluosilicate glass (fluorine doped oxide). Col.2 lines 29-35) using spin on process. Col.2 lines 45-50.

Regarding claims 14, Park teaches that the critical dimensions of any given one of the one or more features is reduced by up to about 50 nanometers (col.4 lines 5-10).

Regarding claim 16, Park teach that the antireflective material is etched using a plasma etch comprising fluorocarbon gas (C₄F₈) (col.3 lines 38-54).

Regarding claim 19, The method of claim 1, further comprising the step of forming a radiation sensitive imaging layer (102) on the antireflective material, the radiation sensitive imaging layer being compositionally different from the antireflective material.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 15 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Park.

Regarding claim 15, Park teaches all the limitations of claims 1 and 14 as shown above but does not explicitly teach that the critical dimensions of any given one of the one or more features is reduced by up to about 80 nanometers.

It would have been obvious to one of ordinary skill in the art to reduce the critical dimensions of any given one of the one or more features up to about 80 nanometers because the critical dimensions of any given one of the one or more features would have been determinable by one of ordinary skill in the art through no more than routine experimentation. See *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

Regarding claim 17, Park teaches that the antireflective material is etched using a plasma etch comprising fluorocarbon gas but does not explicitly teach that wherein an

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amount of the fluorocarbon gas is altered to attain desired reduced critical dimensions for the one or more features.

It would have been obvious to one of ordinary skill in the art to alter the amount of fluorocarbon gas to attain desired reduced critical dimensions for the one or more features because the amount of fluorocarbon gas is an important subject that would reduce critical dimensions for the one or more features and would have been determinable by one of ordinary skill in the art through no more than routine experimentation. See *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Park in view of Claussen et al. (US 6,245,640) or Fisher et al. (US 6,828,259) or Hsueh et al. (US 5,854,503).

Park teaches that the antireflective material (ARC layer) is formed by deposition process but does not explicitly teach that the deposition process is a PECVD process.

It is conventional and also taught by Claussen et al., Fisher et al. and Hsueh et al. that the ARC layer is commonly deposited by PECVD because it is widely available in the semiconductor industry.

So, it would have been obvious to one of ordinary skill in the art to form the ARC layer by a conventional method PECVD as claimed.

Allowable Subject Matter

4. Claims 2, 3, 4, 5, 6, 7, 8, 11, 12, 18, 20, and 21 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

5. Papers related to this application may be submitted to Technology center (TC) 2800 by facsimile transmission. Papers should be faxed to TC 2800 via the TC 2800 Fax center located in Crystal Plaza 4, room 4-C23. The faxing of such papers must conform with the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989). The Group 2811 Fax Center number is (703) 872-9306. The Group 2811 Fax Center is to be used only for papers related to Group 2811 applications.

6. Any inquiry concerning this communication or any earlier communication from the Examiner should be directed to CUONG Q NGUYEN whose telephone number is (571) 272-1661. The Examiner is in the Office generally between the hours of 6:30 AM to 5:00 PM (Eastern Standard Time) Monday through Thursday.

7. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor Eddie Lee who can be reached on (571) 272-1732.

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8. Any inquiry of a general nature or relating to the status of this application should be directed to the Technology Center Receptionists whose telephone number is 308-0956.

A handwritten signature in black ink, appearing to read 'Cuong Nguyen', with a stylized, cursive script.

Cuong Nguyen

Primary examiner

1/7/05